The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

BOUVERIE HOUSE, 154, FLEET STREET, LONDON, E.C.4

Telegrams : ALLANGAS FLEET LONDON — Telephone : CENTRAL 3212 (10 lines)
GLASGOW : 116, Hope Street (Central 3970) — BIRMINGHAM : Daimler House, Paradise Street (Midland 0784-5)
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Industry's Army

EVENTS move with such velocity to-day that whatever may be written may well be out of date before the ink is dry. In such circumstances planning in advance of events is often futile and rarely wholly successful. It is perhaps under these conditions of improvisation from minute to minute that the genius of the British shines at its brightest. To plan painstakingly is the Teutonic genius, to improvise brilliantly, the British talent. In this struggle of individualism versus mass-produced minds, we have faith in our method. Nevertheless, some forethought must always be exercised in planning ahead our major moves, and the improvisation must be devoted primarily to keeping to the path we have laid down. Such a path is that of industrial production. This is a war in which every individual in the country is in the front line as never before. We had air raids in the last war; they were as nothing to the air raids that could, and for ought we can tell may already by the time these words appear, descend upon us. We are in the front line of the battle, or at least we are sufficiently near the front line to be struck by stray missiles aimed either deliberately or at random, at any time of the day or night.

It will be the enemy's aim to prevent production of munitions of war as far as possible. By munitions of war we do not refer only to engines of warfare, shells and such-like, but to goods of all kinds that we can sell abroad for money which will enable the struggle to be continued to the bitter end and until victory is reached. Shells, explosives and ammunition, aeroplanes, guns, tanks, ships are undoubtedly of the very first importance, but second only to these is the export market from which we shall derive our financial strength. The whole fabric of British industry is fighting the battle, from the humblest labourer to the chairman of the proudest company. The first handicap that had to be overborne was what has become known as "Maginot-Line Mentality," the belief that time was on our side and that production could amble gently along in the leisurely peace-time manner. Events have rudely shaken us out of that dream.

The second handicap was the black-out and the safety-first mentality. To such an extent did safety-first obscure our vision that in the earlier days of the war important munition works were prevented from operating at night because officials were not satisfied with the black-out. By all means take all possible precautions, but let us not handicap production by waiting upon safety. The nettle, danger, must be plucked firmly in these days. "Boundless risk must pay for boundless gain." We have, however, solved that problem, so that, in the words of William Morris, "all around was darkness like a wall." Our moonless nights are indeed black as a thundercloud, and within that cloud hides the lightning of England, the furnaces and crucibles of her industrial centres.

Next there comes the danger we are even now facing, that of dislocation of industry by air-raid alarms. That danger is very real and we know that the workmen on the enemy's boundaries are feeling the effects of our continual night raids over their cities and works. By day they work, by night they are kept awake. By night they may try to sleep or to work according to their shifts, but generally they are constrained to go to earth. The dislocation of production is evidently considerable apart from the material damage done to their works and docks and railways. They will try, even now they are trying, to carry the same war into Britain, to check our production, to destroy our works. There are two ways in which this might be countered. One is that of safety first, the retreat into funkholes at the first sign of danger; the other is to trust our own air defences to defend us and to produce more and ever more weapons in order that they may do so. That last method will surely be the method of Britain. Sir John Anderson has announced that it is the considered view of the Government that in order to defeat any efforts by the enemy to dislocate production in our war industries, workers are to be encouraged to remain at work after air-raid warnings have been sounded until it is clear that an enemy attack is imminent. Many instances have been known of long periods in which factories have been stopped because of air-raid warnings, but no hostile aircraft has appeared. This is now to stop, and not until attack is actually about to be delivered will the factories cease work. There is unquestionably a widespread desire among the workers that this shall be done. We all are in the front line and we all are ready to take our place therein. Thrilling deeds have already been performed in the industrial field when danger has threatened; two of these were recorded in our issue of July 6. The courage of the Briton is not changed because he dons a uniform; it is there at all times. To the technical men, the officers in this industrial army, there remains a special task. To them the workers look for guidance and leadership whenever anything unusual occurs. It may be a factory accident; it may be damage through enemy attack. Whatever may be the cause, it is to them that falls the task of saving whatever can be saved and of carrying on. We in industry are in sober truth an integral part of this army that defends Britain.

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NOTES AND COMMENTS

The S.C.I. in War Time

SURROUNDED literally by memorials of Davy, Faraday, and other great chemists of the past, the Society of Chemical Industry held its 59th annual meeting last Tuesday in the hospitable premises of the Royal Institution. Social functions were reduced, officially, to a frugal tea in the library, but the meeting was well attended, and those present were rewarded by two stimulating addresses, the first from the President, the second from Lord Samuel, this year's Messel Medallist. Inevitably both addresses dealt principally with the position of chemists in war time. The President, as was right and proper for one in his position, dealt with the subject from the practical point of view; for though he protested that he was really too academic to hold so important a post on the industrial side of chemistry, it was quite obvious that members were satisfied to leave the affairs of the Society in his hands for another year. Lord Samuel, as a philosopher and statesman, dealt with the broader aspect, treating of the position of the industrial chemist in the scheme of civilisation and his duty towards the furtherance of the good life for all. Both speakers expressed the general consensus of opinion, that the works of chemistry are only means; it is for the individual servant of chemistry to see that these means are properly used.

Red Tape

A VIGOROUS correspondence has been running in *The Daily Telegraph* on the lamentable way in which red tape is retarding the war effort. Every manufacturer has the same story to tell. Under the war time system of licences, quotas, controls and other devices of the bureaucratic machine, he is pushed from pillar to post in an effort to surmount one obstacle after another. His system, tested by the competition of private enterprise, is efficient enough. Labour is enthusiastic and only too anxious to "go to it." There is no lack of orders for war material or for the export trade. It is when a manufacturer tries to unite all these forces in order to make the goods that his troubles begin. The restrictions to which he is then subjected are exceedingly vexatious and wasteful, and must be ruthlessly cut out if the enemy is to be defeated. The German claim that their successes up to this point have been brought about by their unique efficiency is all very well. British industry is more thorough and could be more efficient than German if Government departments would leave it alone and trust it to carry on without amateur intervention. A beginning might be made with the elaborate costing controls which are the despair of all who are doing their best loyally to execute Government contracts. There does not seem to be much sense in imposing the elaborate calculations of involved costing systems on manufacturers who now know that 100 per cent. excess profits are to be taken by the Treasury.

The French Aluminium Industry

IT is as yet too early to state with any degree of accuracy the extent to which the Nazi and Fascist régimes will benefit with regard to supplies of aluminium as the result of the defeat of France. No indication can yet be given as to the dislocation caused to the industry by the war, nor the extent to which the enemy will seek complete control of producing regions. It is important, however, to realise that France possesses two great assets in the way of enormous supplies of good quality bauxite and ample water power for the hydro-electric plant necessary to produce metallic aluminium. The ore itself takes its name from the village of Les Baux in Provence, but is now produced chiefly in the Var Department, which supplies 80 per cent. of the total French output. Other deposits exist in the Hérault Department and in the regions round the mouth of the Rhône. In 1937 a record year was experienced by the French aluminium industry. Nearly 700,000 tons of bauxite—roughly a fifth of the total word tonnage—were quarried from her deposits. Of this total, 300,000 tons were exported for reduction overseas, largely to the United Kingdom as British aluminium producers own big deposits in France. With regard to aluminium itself, production in 1937 rose to 34,000 tons, and in 1938 to 45,000 tons.

Ore Reduction Plants

THE districts in which the ore is reduced are round Marseilles, in the Basses Alpes, and in the Pyrenees. Also, France held considerable interests in hydro-electric reduction plant in Norway. These also have presumably passed into enemy hands, but require imported bauxite or alumina. A series of good quality French alloys had been developed and were available in the normal cast, rolled, drawn, and extruded forms. It would appear that the gains to Germany lie chiefly in the direction of supplies of good quality ore, a commodity which Germany has always lacked. It is, however, important to remember that recent German plant extensions have been developed with particular regard to the exploitation of ores of low quality, and may not be able immediately to take the fullest advantage of the better product, though it is possible that they will make use of French plant even in unoccupied areas.

INDEX TO VOL. XLII.

In view of the current shortage of paper, the Index to Vol. xlii of THE CHEMICAL AGE *is not being bound up with the present issue of the journal. A sufficient supply has, however, been printed separately, and a copy for binding or reference purposes will be despatched to subscribers who apply for one on the form to be found on p. x of this issue. This copy will accompany the issue of the journal immediately following the receipt of the application.*

Society of Chemical Industry

Annual General Meeting—Messel Medal Presented

THE 59th annual meeting of the Society of Chemical Industry was held in the afternoon of July 9 in the rooms of the Royal Institution, Albemarle Street, London, W.1. Owing to war-time conditions, the social functions with which the meeting is normally associated were reduced to a minimum, and the whole proceedings occupied little more than three hours, instead of the customary five or six days.

The proceedings opened at 2.30 p.m. with the annual general meeting, the President, Professor J. C. Philip, F.R.S., being in the chair. After the minutes of the 58th annual general meeting had been approved, Mr. H. J. Pooley, general secretary, presented the annual report of the Council.

Referring first to the effort made to awaken special interest in the activities of the Society in a quarter of England hitherto untouched, namely, the South-West, Mr. Pooley expressed confidence that, although the good effect could not be felt immediately, the effort had not been wasted, and that with the resumption of normal conditions, the Society could carry on the good work in the South-West, starting from the firm foundation that had been laid. He then pointed out that the report included a new feature, namely, a complete list of the meetings of the branches of the Society, with notes as to where the published reports of such meetings could be found. This had been included because the planned programmes had been completely altered, owing to war conditions, and it was essential to have a definite record of what had actually been done. In spite of the war, the membership had increased from 3975 at the end of 1938 to 3997 at the end of 1939, but it was to be expected that the later trend of international events would lead to losses in numbers. Present indications, however, showed that the loss would appear to be very much less than might have been expected. Regular monthly meetings were held throughout the session and of the local sections there was not one that had not carried out a programme of activity but little removed from those of normal times.

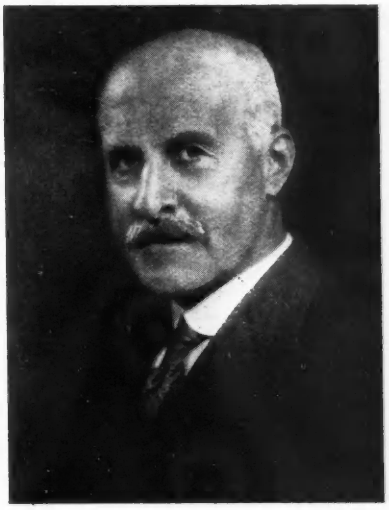
The following officers were appointed for the session 1940-41: President, Professor J. C. Philip (re-appointed); vice-presidents, Mr. W. P. Cohoe, Dr. R. T. Colgate, Mr. B. G. McLellan and Professor H. L. Riley (replacing Messrs. E. Gabriel Jones, H. Levinstein, T. W. Smith, and F. D. Snell, who have retired). Dr. L. H. Lampitt has once again undertaken the duties of honorary treasurer which he now combines with his many other offices.

To fill four vacancies among ordinary members of the Council caused by the retirement of F. P. Dunn, T. H. Gant, Professor J. Reilly, and Dr. G. S. Whitby, the following were elected by ballot: G. Dring, C. S. Garland, Dr. A. J. V. Underwood and Dr. G. S. Whitby.

The following changes in the officers of sections and groups have likewise taken place:—

Section	*Retiring Chairman*	*New Chairman*
American	W. P. Cohoe.	Dr. L. T. Work.
Birmingham	G. Dring.	G. King.
Canadian Pacific	—	Dr. R. H. Clark.
Liverpool	B. D. W. Luff.	H. E. Potts.
Montreal	Dr. L. Lortie.	J. S. Rovey.
Newcastle	Prof. H. L. Riley.	Dr. A. A. Hall.
Ottawa	A. A. Swinnerton.	Dr. P. Larose.
South Wales	Frank Bird.	J. Christie.
Yorkshire	B. G. McLellan.	S. Billbrough.
Road and Building Materials Group	F. G. Turner.	Dr. F. M. Lea.
Canadian Council	T. W. Smith.	V. G. Bartram.
Section	*Retiring Secretary*	*New Secretary*
Canadian Pacific	Dr. R. H. Clark.	W. H. Hill.

With a view to a stabilisation of the policy towards publications and for the better guidance of the Finance Committee, Council has set up a publications committee under the chairmanship of F. P. Dunn, which controls three sub-committees, on each of which are two members of the main committee. The committees have investigated in closest detail a wide variety of suggestions for the improvement of the publications within the limit of expenditure available. A middle course which will satisfy the scientific member and the industrialist in one common publication is not easy to find, but a programme of definite progress along this road had been formulated for immediate action in 1940 and had received the approval of Council. The changed conditions due to the war, paper shortage, and similar conditions necessitated postponement, but the effort will not be wasted.



Professor J. C. Philip, F.R.S., President of the S.C.I.

The income and expenditure account showed a nearer balance that in the last two years. If the monies received from the Messel Fund and the contributions from the Chemical Council be excluded, the working of the Society showed a deficit in 1937 of £2649, in 1938 of £3430, whilst this year it is £2418. The Council reported a small increase of £200 in subscriptions and an increase in the income from the journals other than that part associated with advertisements. At the beginning of 1939 the Council, bearing in mind the deficit of 1938, determined to bring into operation certain economies, which had resulted in a saving of some £2100 in expenditure on the journal. Local sections' economies had also materially assisted in reducing the deficit.

After the report and the accounts had been adopted, and the auditors reappointed, the members expressed their thanks to the honorary officers for the valuable time and service they had given during the session. Professor Philip then rose to deliver his Address.

The Presidential Address

The President's discourse dealt principally with the position of chemists at the present time, naturally with special reference to the war. The scheme of co-operation now in hand between the three chartered bodies in the chemical world—the Chemical Society, the Institute of Chemistry, and the Society of Chemical Industry—typified the recognition of the chemist's position as an important unit in the national economy. At the outbreak of war in 1914 the deficiencies in the British chemical industry were glaring: in dyestuffs, fine chemicals, and laboratory glassware, for instance, we were then a long way behind Germany. But the stimulus given by war conditions to the chemical industry had started the country in the right direction, and by the safeguarding of industries after the war, we had been able to maintain such a position that at the outbreak of the present war the chemical industry was fully qualified to play its due part in the national effort. As a consequence the prestige of chemistry

and the status of chemists were much higher to-day than they had been formerly.

The younger members of the industry to-day were apt to take for granted such institutions as the Department of Scientific and Industrial Research and the Association of British Chemical Manufacturers; but these institutions were the outcome of the last war, and by their material support the importance and influence of chemistry and chemical industry had been able to exercise their due weight. The D.S.I.R. was especially noteworthy as an enterprise that was aided by the State and directed by scientists.

Speaking of the arrangements for directing the full energy and ability of chemists towards the national effort, Professor Philip referred to the Universities' Joint Recruiting Board and the Central Register of the Ministry of Labour and National Service. The reserved age of 21 had been established for chemists (excluding pharmacists), and for metallurgists and chemical engineers. This was certainly an improvement on the unrestricted plan of voluntary enlistment which existed at the beginning of the last war, when workers in the explosives industry were actually withdrawn from it to serve in the fighting forces. It was not until 1918 that a more or less satisfactory scheme of national service had been evolved, but upon that scheme it had been possible to found the present system. The machinery was not entirely satisfactory; for instance, no satisfactory definition of a "chemist" had yet been decided upon, and there were certain difficulties involved in the question of the continuation of research work at the universities. The President expressed the opinion that chemists should not be retained for advanced university study unless their work was *directly* helpful to the national effort, a sentiment which evoked the outspoken approval of the meeting. It was probable also that certain employers had discouraged their employees from registering and it might be that a system of compulsory registration would be desirable.

These questions, however, were mainly a consideration of what had been done in the past, and the great decision facing every chemist was what was to be done now. An essential limitation of science was that its discoveries could be used either for a good or for an evil purpose, and the main problem of civilisation was the wise use of products that science put at its disposal.

At the close of the President's address Dr. Cullen expressed the thanks of the Society to Professor Philip for the admirable way in which he had discharged the duties of President during a year of the utmost difficulty, and the meeting then adjourned for tea.

Presentation of the Messel Medal

At 5 p.m. the meeting reassembled in the lecture hall for the presentation of the Messel Medal to the Rt. Hon. Viscount Samuel and to hear the Medallist's Address. In presenting the medal, the President spoke of the career of Rudolph Messel, the originator in this country of the manufacture of sulphuric acid by the contact process. He was born at Darmstadt, in Germany, in 1870, but his career in industrial chemistry was almost entirely associated with England, and his memory is preserved not only by the medal but also by the famous firm of Spencer, Chapman and Messel. The medal is awarded every second year to men distinguished in Science, Industry, Literature, or Public Affairs or who have especially benefited the Society. In presenting the medal to Lord Samuel, the Society were honouring him both as President of the British Institute of Philosophy and as an "elder statesman"; in the latter connection the President recalled that a previous presentation of the medal had been made to Lord Balfour.

The Medallist's Address

Lord Samuel chose as the subject of his address "Science and Civilisation," with special reference to the science of chemistry. In reviewing such a subject, Lord Samuel said, it was proper to consider how one's life-work fitted in with the scheme of things—the life-work of Rudolph Messel might be taken as an example—and how our civilisation stood in presence of the eternities. It had been said with some justice that among the offspring of the marriage of Science and Industry were devils of destruction; and the question had been asked whether it would not be better if we had no science. It was even contended by some that it would be best to cancel the advances of the last two centuries.

If industrial chemists asked themselves whether they were pioneers in the upward march, or were fundamentally misguided, they must remember that Science and Industry are not ends in themselves, but only means in the search for the whole welfare of man. Means must not be allowed to dominate, but it was not true to say that therefore they do not count. Man must have first the physical basis for his advantages—to-day he must even seek the physical means to defend the good way of life. The applications of science were therefore certainly worth while. If we imagined that modern applied science was wiped out, we could picture the loss—in medicine, in surgery, in the preservation of infant life, in agriculture. Scarcity and famine would bring back penury and death.

Industrial science, moreover, had made accessible to everyone commodities and amenities that were formerly regarded as luxuries available only for the few. Sir Richard Livingstone, the famous classicist, had said, "The Greeks could not broadcast the Æschylean trilogy, although they could write it."

Science and War

To blame Science for wars was obviously unreasonable. It was man's perversity that misused what his ingenuity invented. Horace Walpole had written ominously and prophetically about balloons (the latest discovery of Science in his day) and added "Could we reach the Moon we should think of reducing it to a province of some European kingdom." Most of the inventions used in war were made for peaceful ends, but men of peace dared not leave Justice with only her sword to meet Injustice armed with machine-guns and grenades.

Science has a right to ask from Society the conditions that may best assure its success in beneficient tasks. First, encouragement of research in both pure and applied science; this might lead even to a third Industrial Revolution based on subatomic energy. Professor Bernal had suggested a reorganisation of national expenditure on research, and the state grants in aid of universities and the D.S.I.R. were steps in the right road. Lord Samuel said that he wished there were a body in Parliament for the stimulation of research and of public interest in science.

The second condition was the proper dissemination and organisation of knowledge, and here the Society of Chemical Industry and other such bodies had their function. Their active members were the intelligence staff officers of the army of science. Until lately, there had been no national boundaries to Science, but the crazy creed of self-sufficiency nationalised and racialised even Science. A German scientist had stated that "Physics henceforth must be German Physics," because, forsooth, Einstein had "polluted" Physics, and Russian speakers had been guilty of such remarks as "We stand for party in Mathematics" and "The Marxist-Leninist theory of farriery." Such follies could not long endure, but while they lasted they created great damage.

Industrialists translated thought into deed. Ideas would be fruitless without their energy, their willingness to take risks, and the work and co-operation of their staffs. The medallist himself had presided over the Coal Commission of 1925, which had recommended that the coal industry should become imbued with a scientific spirit and that new methods should be found and a proper standard established for the workers. Last year on investigation he had found that the great majority of the Commission's recommendations had been put into practice. The industry had definitely made a forward move.

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Industrial Chemicals in Cane Sugar Manufacture

Sulphitation and Carbonatation

By J. G. DAVIES

(*Sugar Technologist, Imperial College of Tropical Agriculture*)

THE inherent nature of the juice of the sugar cane is such that treatment with heat and chemicals is necessary before an acceptable commercial sugar can be recovered from it. In order to indicate better the scale on which the operations are carried out, the following preliminary information is included. The sugar cane is a member of the grass family. It grows in clumps or stools, each stool containing from five to fifty stalks. The stalks are ½ in. to 2 in. in diameter, up to 14 ft. long, and may either stand erect or lie recumbent. The yield of cane is of the order of 20 to 60 tons per acre, with small isolated areas yielding at the rate of 110 tons per acre. The amount of sugar recovered from the cane varies with its quality and also with the efficiency of the factory to which it is sent. Most of the world industries expect one ton of sugar from 7 to 10 tons of cane. The juice is extracted by squeezing in mills. Imbibition or maceration liquids are added.

The extracted juice is treated with heat and chemicals to precipitate certain impurities which are eliminated by subsidation or filtration. The excess water in the juice is then removed by multiple-effect evaporation. After crystallisation of the sucrose by further single-effect evaporation, the crystals are separated in centrifugals.[1] The rate of throughput in sugar factories varies immensely, from 3 to over 300 tons of cane per hour. A ton of cane yields about 170 imperial gallons of juice, the amount depending on the variety and the intensity of milling. Together with the imbibition liquids, the amount of dilute juice to be processed is of the order of 200 gallons per ton of cane ground. Inversion of sucrose sets in almost as soon as the juice is extracted, hence the various steps in the manufacture must be carried out as rapidly and as smoothly as possible. Cane sugar factories produce 65 per cent. of the 30 million tons of sugar made per annum.

Juice Characteristics

Hardy[2] gives the analysis of cane juice as :—

	per cent.	
Water	77-88	
Sucrose	8-21	12-23 per cent. total solids, i.e., °Brix.
Reducing sugars	0.3-3.0	
Other organic compounds	0.5-1.0	
Inorganic compounds	0.2-0.6	

The non-sugars may be subdivided as :—

	per cent
Hemicelluloses and pentosans	8.5
Pectins	1.5
Higher proteins	7.0
Simpler proteins	2.0
Amino acids	9.5
Acid amides	15.5
Organic acids (other than amino acids)	13.0
Colouring matters	17.0
Waxes, fats and soaps	17.0
Inorganic salts and silica	9.0

Fresh raw juice has a reaction of *p*H 4.8-5.6. It is fairly highly buffered. In appearance, it is a cloudy green liquid, owing to the presence of colloids and natural colouring matters. The colloids are negatively charged.

Clarification Requirements

Industrial chemicals are used in conjunction with heat during the stage of manufacture known as clarification. This occurs immediately after extraction of the juice by milling. The method of clarification used depends on the characteristics of the juice and on the type or grade of sugar desired. The process may be subdivided on a broad basis into raw sugar clarification and direct-consumption sugar clarification. By raw sugar is meant the 96° polarisation test sugar of commerce, which is nearly always refined before consumption. Direct-consumption sugars include West Indian Crystallised (Yellow Crystals or Demerara Crystals), Sulphitation Whites and Carbonatation Whites. Raw sugar clarification is less intensive than that used for direct-consumption sugars. All commercial processes of each type are based on the addition of a suspension of lime and heat to the raw juice. For direct-consumption sugars, sulphur dioxide or carbon dioxide are added as well.

Maintenance of pH Essential

It is patently necessary that whatever procedure may be adopted the prime object of removing impurities and of obtaining a clear juice must be achieved. Another essential is that no sucrose should be lost by inversion owing to the maintenance of too low a *p*H value nor any of the reducing sugars destroyed by the maintenance of too high a *p*H value. The destruction of reducing sugars in alkaline solutions at temperatures above 55° C. results in the formation of decomposition products. These in combination with calcium form deeply-coloured reddish-brown complexes which are objectionable. The presence of reducing sugars in cane juice is one of the main differences between it and beet juice. The cane sugar manufacturer must therefore neutralise the natural acidity of the juice to avoid inversion. But, unlike the beet sugar manufacturer, his scope above the neutral point when the juice is to be heated to 55° C. or more is definitely limited.

In order to produce a bright, sparkling juice after clarification, the raw sugar process depends for success with average juices on an adequate concentration of P_2O_5 being naturally present in the juice. The optimum concentration now thought necessary is 0.025-0.030 gm. P_2O_5 per 100 ml. juice. The requirement is that upon the addition of lime, an optimum precipitate of calcium phosphate is obtained which entrains and removes juice impurities during subsidation. There is a definite correlation between P_2O_5 concentration and the volume of the precipitated settlings or mud. Since the latter is resettled and then filtered, mud volume is of industrial importance and certain limits must be imposed for economic operation.

It has previously been stated that all present-day clarification processes are based on the use of lime and heat. More than 600 chemical compounds have at one time or another been tried, but lime and phosphoric acid, sulphur dioxide or carbon dioxide still persist as the only desirable commercial defecants.

Most cane-growing countries have their domestic supply of limestone. The sugar factory buys it either as burnt lime or as hydrated lime. In each case it is eventually consumed as a suspension of calcium hydroxide. It is obvious that in considering purchase from any one source of supply, the lime content of the product is of importance. For cane juice clarification work, not only the amount but also the nature of the impurities is probably of even greater significance. In fact, some factories which have a local or adjacent supply prefer to import their lime from Great Britain or elsewhere only and solely for this reason.

The suspension of lime as used in the factory is generally adjusted to a density of 15°Baumé. Consumption varies from 0.5 per cent. to 10 per cent. by volume of 15°Baumé lime on juice, depending on the clarification process. Even small

[1]For a full simple description, see Davies, *Principles of Cane Sugar Manufacture* (N. Rodger, 7 Idol Lane, London, E.C.3, 10s.)
[2]Hardy, *Tropical Agriculture* (Sugar Supplement), 1927, IV, 38.

amounts of impurities in the lime can produce detrimental results. Silica, iron oxide, alumina and sulphates collect on the heating surfaces of the evaporator, forming scale and reducing heat transmission. The presence of magnesia retards the rate of settling of the precipitated impurities and leads to congestion in the subsider station.

Recent work in Hawaii, Trinidad and elsewhere has shown that substantial benefit can be obtained by allowing a 5-15 minute period of contact between the added milk of lime and the juice before heat is applied.

Some juices respond to the simple lime and heat treatment, i.e., the cold liming process, very readily. Large, well-formed flocs are obtained which settle rapidly and leave a brilliant, limpid juice for decantation. Other juices are more difficult to deal with. In such cases, the milk of lime may be added after heating, i.e., hot liming, or it may be added partly before heating and partly after, i.e., pre-liming, or a second heating may be applied in conjunction with two liming doses, i.e., fractional liming and double heating. The variations are mentioned in order to show the wide divergence of character shown by cane juices from commercially grown varieties.

When the phosphate content of the juice is low, it is brought up to optimum value by the addition of a dilute solution of phosphoric acid, superphosphate, or one of the ammonium phosphates. Normally, the addition is made immediately before adding the milk of lime.

Sulphur dioxide, for use in the manufacture of direct-consumption sugars, is generated in the factory by burning stick sulphur in a stove. Proper control must, of course, be maintained in order to avoid corrosion of equipment. Some beet sugar factories use the substance in the more convenient liquid form, but freight charges are not in favour of this for the cane sugar industry. The amount of sulphur dioxide used depends on various factors. It varies from 0.05 to 0.30 gm. SO_2 per 100 ml. juice. In yellow sugar production the lower value is used. The absorption takes place by drawing a current of the gas up a tower down which the juice cascades. This occurs before the addition of lime and heat, although some factories "sulphur" later in the process. The procedure with the higher concentrations, which is expensive and used for the manufacture of white sugar, varies a great deal. Sulphuring may occur at almost any stage up to crystallisation. In this case either sulphiting vessels are employed in which gas is blown through each batch of juice or else a continuous sulphiting arrangement such as the Quarez is installed. The milk of lime may be added before or after or during the sulphuring process.

The fundamental mechanism of sulphitation is similar to that of phosphoric acid in raw sugar manufacture. A large precipitate of calcium sulphite is produced within the juice which, on forming and during settling, entrains and removes juice impurities. The result is a more effective one than that obtained with phosphoric acid in optimum commercial quantities. The sulphite precipitate is compact and not bulky like the phosphate one. Also, and again unlike the phosphate precipitate, it filters very readily. After removal of the precipitate by subsidation or filtration, further small amounts of SO_2 are added to the juice to obtain a bright sugar on crystallisation.

The Carbonatation Process

The minority of white sugar factories use the carbonatation process. Large volumes of milk of lime are added to the juice which is then brought back nearer to neutrality by the addition of one (single carbonatation) or of two doses (double carbonatation) of carbon dioxide. In both these processes, the entire bulk of juice is filtered. Such is not necessarily the case in sulphitation and very seldom the case in raw sugar manufacture. The carbon dioxide gas is obtained from the factory's lime-kiln, although flue gases have been suggested as a suitable source. The clarification obtained with this procedure is even better than that of sulphitation. The cost of operation is, however, higher, but the quality of the sugar is better. Sulphitation white sugars tend to darken on keeping. Carbonation white sugars do not.

While clarification is the main point of consumption of chemicals in the cane sugar factory, there are various other requirements which must be provided for. The two most important are boiler-feed water treatment and incrustation removal. Boiler-feed water problems are common throughout the industrial world and require no special mention in this particular connection. Incrustation removal, on the other hand, may be of greater interest. Incrustations form on the tubes of the juice heaters, and on the heating surface of the evaporators and to a lesser extent of the vacuum pans. Juice heater scale is generally easily removed by scrapers, although in some cases chemical methods are necessary. The problem is of lesser magnitude than that of evaporator scale, because a heater unit is relatively cheap and spare capacity can be installed.

Evaporators are of the triple or quadruple multiple-effect vertical-tube type. Incrustation becomes progressively heavier towards the last vessel. Mechanical removal is now losing ground and chemical removal is finding greater favour. The actual solution or combination of solutions used depends on the characteristics of the scale to be removed. Caustic soda, soda ash, both with and without muriatic acid, ammonium fluoride, or sodium fluoride are the commonest. At one time the chemical was merely boiled in the vessels; but now the procedure is to circulate a fine spray of the hot solution over the heated heating surface. The removal is more efficient and takes less time. Brushing may or may not follow. Recently attempts have been made with success to inhibit scale formation by adding very small quantities of tri-sodium phosphate to the juice immediately before it enters the evaporator. Scale on the tubes or coils of the vacuum pan is not usually serious and can be easily removed manually during the week-end stoppage.

Oil and Colour Chemists

Annual Meeting of the Association

THE annual general meeting of the Oil and Colour Chemists' Association was held at the offices of the Federation of British Industries, 21 Tothill Street, Westminster, London, on July 4. Mr. A. J. Gibson (President) was in the Chair. The following officers were elected under the new constitution of the Association:—

President, Mr. W. E. Wornum; vice-presidents, Mr. H. Clayton, Mr. G. N. Hill, Dr. L. A. Jordan, Mr. G. L. Riddell, Mr. S. K. Thornley; council, section committees' nominations: *London*: Mr. David E. Roe; *Manchester*: Mr. F. J. Siddle; *Scotland*: Mr. J. Milligan; hon. secretary, Mr. C. W. A. Mundy; hon. treasurer, Mr. H. D. Bradford; research and development officer, Dr. J. O. Cutter; hon. auditor, Mr. M. E. Dougherty.

In the annual report of the Council it was noted that in spite of the difficulties arising out of the war, several meetings had been held and the membership continued to increase, standing, at the date of this report, at 666 for all sections.

Mr. A. J. Gibson, the retiring President, spoke of the reconstruction of the Association and the decentralisation of the organisation, and especially the formation of the London Section. Although the new rules might be imperfect he suggested that, broadly speaking, they represented an adequate framework on which the future administration could be built up. The Association now had a strong, live membership suitably decentralised for the purpose of rapid growth and controlled by a Council which was constituted to function efficiently.

Mr. W. E. Wornum, the new President, after thanking the members for electing him, said that whilst the war was bound to have a restricting influence on the work of the Association it could truthfully be said that their misfortunes were their opportunities. Moving that a hearty vote of thanks be accorded to the retiring President, he recalled that the bulk of the work of reconstituting the Association had fallen upon Mr. Gibson who had brought to bear upon it a great deal of courage and energy and an enormous amount of time. Dr. G. F. New seconded the proposition, and the vote of thanks was heartily accorded.

LETTERS TO THE EDITOR

Further Sources of Scrap Metal

SIR,—Those industries which use iron and steel, or whose equipment involves the use of machinery, have been approached by the Iron and Steel Control with a view to their making available such supplies of iron and steel scrap as are in their possession. There has been a considerable response to this appeal, and that response has been largely helped by the ready co-operation of the technical Press. There is, however, evidence that there is still a large amount of available iron and steel lying in factory yards and sheds, and in maintenance departments, which might well be surrendered as scrap in the national interest, at the present juncture.

Everybody is aware that it is characteristic of maintenance engineers, and those who are in charge of repair and maintenance departments of works generally, and who are keen and conscientious, to make it a habit to keep supplies of spares and, indeed, of obsolete parts and machinery, lest on some future occasion when the need arises they should be found short. There can be no criticism of this attitude. On the other hand, the national need for all the available iron and steel, either as discarded machinery and parts or as scrap, is so great to-day that it outweighs even the advantages of providing against the future so far as individual firms are concerned.

I am therefore writing to you in order that, through the medium of your paper, I may appeal to heads of firms to see that as much of this kind of material as possible is given up for the purpose of being converted into iron and steel for munitions and armaments. May I suggest to them that even the provision of what may possibly be needed in the future by their own firm should take second place to the urgent national need. We all know that armaments and munitions for the fighting forces are needed in ever-increasing quantities. These cannot be provided in abundance unless a continuous flow of scrap is forthcoming. Therefore I make this further appeal that everyone should join in this drive, even if it involves a little personal sacrifice.—Yours faithfully,

H. E. CRAWFURD,
Scrap Iron and Steel Campaign.

London, W.C.2. July 6, 1940.

Chemical Matters in Parliament

Scientific and Industrial Research

IN the House of Commons last week Mr. Salt asked the Lord President of the Council whether he was satisfied that the Department of Scientific and Industrial Research had an adequate staff to enable it to investigate quickly, and to sort out, the large number of inventions which were submitted at the present time, some of which might be of the greatest value in connection with the prosecution of the war; and whether he would consider the desirability of adding to the present staff and utilising the services of the large number of persons with scientific qualifications whose names were on the Central Register but who were still without useful employment.

Mr. Chamberlain replied that the number of inventions submitted to the Department of Scientific and Industrial Research was not large, and the Department's existing staff was adequate to deal quickly with those which it received. In any event, inventions such as those relating to munitions of war, or other military, naval, air or home defence problems were referred immediately to the appropriate other Department. The second part of the question did not therefore arise.

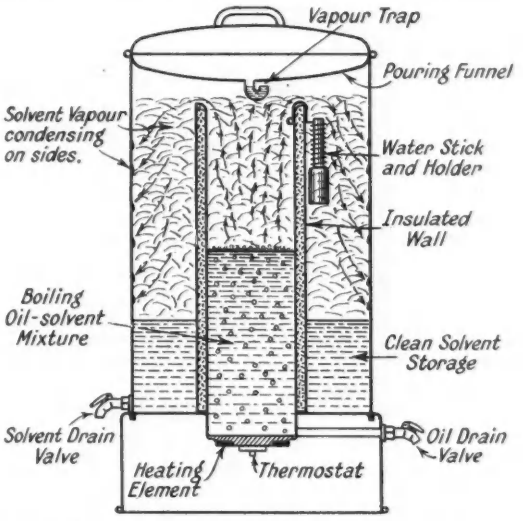
Mr. Salt also asked the Lord President of the Council whether any representatives of the Dominions operated in conjunction with the Department of Scientific and Industrial Research; and what arrangements were made for looking into inventions submitted to that Department by Dominion inventors.

Mr. Chamberlain: Close contact is maintained directly between the Department of Scientific and Industrial Research and the corresponding research departments in the Dominions. Publications and reports are exchanged, and immediate consultation is usual on all matters of common interest.

Small Automatic Still

Useful for Solvent Recovery

A SMALL, fully automatic still for reclaiming chlorinated hydrocarbon solvents, such as carbon tetrachloride, ethylene dichloride, perchlorethylene, and trichlorethylene, is described in *Chemical Industries* (1940; *46*, 6, 718). The grease-laden or oil-laden solvent is poured into the top of the still. This drains into the inner cylinder container which is insulated from the outer container and has its top several inches below the top of the outer container. The inner container is electrically heated at the bottom. As the mixture is heated, the solvent vapours rise and pass into the outer container, as illustrated in the diagram. As this vapour comes



into contact with the wall of the outer container, it is condensed and runs to the bottom of the outer container where it is stored for further use. The inner container has a separate draw-off for oil remaining after distillaton. The electric heating element is thermostatically controlled and provided with an indicator light to tell when process is completed.

SOCIETY OF CHEMICAL INDUSTRY

(*Continued from page* 20.)

But the fundamental thing that really mattered was the work of the individual, and the greatest individual of all was the originator—the genius—the man in whom were combined the lightning-flash of the sudden idea with "the infinite capacity for taking pains." Rudolph Messel himself showed the combination of the flash of genius, broad knowledge, hard work, and, above all, the sense of a mission. "He steered not only by compass, but by the stars." An ethical ideal must be the goal. One evening on the Mount of Olives, Einstein had said to the medallist himself "The present troubles of the world are due to Science having advanced faster than Morality." The end of the troubles will come when Morality overtakes Science.

The President concluded the proceedings by thanking Lord Samuel for his Address, and by expressing the gratitude of the Society to the Managers of the Royal Institution for their hospitable accommodation.

Personal Notes

MR. LESLIE O'CONNOR, of the interim Committee of the British Hard Coke Association, has been appointed Coke Supplies Officer by the Secretary for Mines. He will take over the control of hard coke.

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PROFESSOR J. W. COBB, who retired in 1939, under the age limit, from the Livesey Professorship at Leeds University, is to have the honorary degree of D.Sc. conferred upon him by the University.

* * * *

CAPTAIN HENRY W. WEATHERSBEE, deputy managing director of Horlicks, Ltd., has been nominated Board of Trade representative of the Area Supply Board, for the Southern Region.

* * * *

MR. R. J. BARRITT, of Simon-Carves, Ltd., Cheadle Heath, Stockport, has taken over the duties of secretary of the Gas and Coke Making Equipment Export Sub-Group from Mr. M. W. Burt.

* * * *

DR. VLADIMIR N. IPATIEFF, director of chemical research of Universal Oil Products Co., and professor of chemistry at Northwestern University, has been awarded the Willard Gibbs Medal for 1940, for conspicuous contributions to chemistry, by the Chicago Section of the American Chemical Society.

OBITUARY

MR. JOHN GJERS, managing director of Gjers Mills and Co., Ltd., and an expert metallurgist, died in Middlesbrough last week, aged 51. He was a grandson of the founder of Ayresome Ironworks, Middlesbrough.

* * * *

MR. LEONARD WALTON SCHUSTER, who died last week at Camberley, was chief research engineer to the British Engine, Boiler, and Electrical Insurance Co., Manchester. He was well known as a consultant metallurgist, especially as an expert on fusion welding of steel.

Antifreeze Liquids

Inhibition of Corrosive Action

SALTS of an organic base with a strong acid have a strong depressant action upon the freezing point of water and have been proposed as substitutes for ethylene glycol, glycerine, sodium lactate and methyl alcohol. Freezing points of 40 per cent. aqueous solutions of typical compounds in this class are appended (U.S. Pat. 2,200,184):

Monoethanolamine chloride	-43° C.
Monoethanolamine acetate	-35° C.
Triethanolamine phosphate	-15° C.

The *p*H of solutions for use in motor-car radiators and the like should be adjusted to 6-9. It is of interest to note that triethanolamine phosphate happens to be in standard use in this country as a corrosion inhibitor for ethylene glycol antifreeze fluids for aircraft wings.

Other corrosion inhibitors for ethylene glycol have been developed in American research laboratories. They include nitroamines, imines or amides, such as *m*-nitroaniline, 8-nitroquinoline and nitrourea. In the proporton of between 0.01 and 1 per cent. they inhibit possible corrosive action of ethylene glycol upon iron, brass, copper, solder and aluminium. A typical mixture comprises 0.4 per cent. nitrourea added to ethylene glycol with sufficient caustic soda to bring the *p*H to 7.0. This is made up to 35 per cent. concentration in water. Other inhibiting agents are the nitro-hydroxy compounds, examples of which are picric acid (trinitrophenol), dinitrophenol and dinitroresorcinol. An effective mixture for incorporation with ethylene glycol comprises picric acid 0.5, ammonium molybdate 0.3, sodium carbonate 0.5 and sodium nitrate 0.3. (U.S. Pats. 2,197,774-5.)

New Control Orders

Toluene Control

THE Control of Toluene (No. 1) Order, 1939, has been in force since November 16, 1939, and it has now been found necessary to revise the Order and reissue it as the Control of Toluene (No. 2) Order. The new Order came into force on July 5 and has been agreed by the Toluene Advisory Committee on which the industry is strongly represented, and while recast in an entirely new wording does not differ very much from the previous Order. The main points of difference can be summarised as follows:—(1) British subjects trading in toluene abroad are brought under control; (2) the price schedule is detached from the price of motor benzol and actual prices are set forth in the Order. These will be subject to review from time to time as necessity arises.

British Chemical Prices

Market Reports

A QUIET tone characterises most departments of the general chemical market, and buying has been more or less limited to day-to-day requirements. Deliveries against existing contract commitments are proceeding along normal lines, although there is little inquiry for fresh long term business. Further advances have been announced by the makers of cream of tartar and tartaric acid, but quotations generally remain unaltered at recent levels. There is little improvement in the supply position of a number of potash compounds, and quotations in the majority of cases are nominal ones only. In the market for coal tar products, trade is noticeably less active, with buyers content to hold small stocks rather than enter into fresh commitments.

MANCHESTER.—Whilst, on the whole, there is a continued steady demand for chemicals against contracts, a contraction here and there has been reported on the Manchester market during the past week, notably in the case of the paper-making trade, whilst long-term prospects in the cotton textile trade are not at the moment regarded too promisingly. A moderate volume of fresh buying has been reported. Several products continue in short supply and odd parcels that make their appearance find a ready market at high prices. In the tar products section the light materials remain the most active and the market for these is firm. Pitch is now in nominal supply.

GLASGOW.—During the past week orders in Scotland for heavy chemicals have not ceased to pour in, and although in some cases at enhanced values, the industrialists have accepted with a good-natured complacency. In view of the present European situation it may be that even higher prices will be asked for certain commodities soon. Oxide of chromium and chromic acid have been increased 2d. per pound from July 1, and chrometan crystals ½d. per pound.

Price Changes

Ammonium Phosphate Fertilisers.—£14 11s. 9d. to £19 19s. 6d. per ton in 6-ton lots, September delivery, with a rebate of 1s. 6d. per ton for August delivery, and 3s. per ton for July delivery, d/d farmer's nearest station.

Calcium Cyanamide.—£21 per ton, c.i.f., on 21 per cent. basis; supplies small.

Concentrated Complete Fertilisers.—£14 13s. 9d. to £14 19s. 3d. per ton in 6-ton lots, September delivery, with a rebate of 1s. 6d. per ton for August delivery and 3s. per ton for July delivery, d/d farmer's nearest station.

Cream of Tartar.—100 per cent. £6 9s. 6d. per cwt., less 2½ per cent., d/d in sellers' returnable casks; imported material would be dearer.

"Nitro-Chalk."—£9 14s. 0d. per ton in 6-ton lots, d/d farmer's nearest station, July/September delivery.

Ammonium Sulphate.—£9 13s. 0d. per ton in 6-ton lots, September delivery, with a rebate of 1s. 6d. per ton for August delivery and with a rebate of 3s. per ton for July delivery, d/d farmer's nearest station.

Tartaric Acid.—1s. 8¾d. per lb., less 5 per cent., carriage paid for lots of 5 cwt. and upwards. Makers' prices nominal; imported material 2s. 3d. to 2s. 6d. per lb., ex wharf. MANCHESTER: 1s. 9d. per lb.

THE MINISTER OF SUPPLY has made the Control of Iron and Steel (No. 11) Order which came into force on July 8 prohibiting, with certain exceptions, the use of iron and steel for buildings, except under licence. No licence will be required for the use of steel for building, where the purchase of that steel has been authorised by a Department for that purpose under the Steel Distribution Scheme, or has been licensed by the Ministry of Supply (Iron and Steel Control) on or since April 1, 1940.

General News——From Week to Week

IT IS REPORTED that the Distillers' Company have applied for £3,000,000 of the new 2½ per cent. National War Bonds.

THE INTERNATIONAL WELDING CO., LTD., advise that their temporary address from July 1 is 2 South Parade, London, W.4. Telephone: CHIswick 1231.

THE BOARD OF TRADE has made an order under which all exports to Algeria, Tunisia, and the French zone of Morocco are now prohibited.

THE NEW ADDRESS of Rumex Oil Products, Ltd., is now Wye Rapids Hotel, Symonds Yat, Herefordshire. Tel.: Whitchurch (Herefordshire), 36.

PRODUCE MERCHANTS, LTD., have moved from Tower House, Trinity Square, London, E.C.3, to 110 Cannon Street, E.C.4. Tel.: MANsion House 2094-3.

DURING A FIRE last week at the factory of Beck Koller, Ltd., Speke, Liverpool, vats of synthetic resin boiled over and caused a series of explosions. When the fire brigade arrived the roof had collapsed and flames were shooting high into the air. Drums of varnish exploded and a boiling chamber was gutted.

MESSRS. EDWARD ARNOLD AND CO., of Maddox Street, London, W.1, announce the publication of *Boiler House and Power Station Chemistry*, by Dr. Wilford Francis, F.I.C., price 15s. The book is divided into two sections, the first descriptive, the second analytical, and should be of great value to all concerned in the chemical aspects of coal combustion and the industrial chemistry of water and oil.

THE SECRETARY FOR MINES announces that the explosives Antifrost Nitrox No. 3, Antifrost Nitrox No. 3 (Sheathed), Antifrost Gelammonite No. 3 and Antifrost Gelammonite No. 3 (Sheathed), manufactured by Cooke's Explosives, Ltd., at Penrhyndeudraeth, Merionethshire, have been added to the List of Permitted Explosives for general use in mines to which Part II of the Explosives in Coal Mines Order applies. The sheaths are of sodium bicarbonate, either felt or powder.

MANCHESTER CORPORATION GAS DEPARTMENT in its annual report states that the production of tar in the year to March 31 was 23,227 tons (13.13 gallons per ton of coal) against 28,008 tons (15.02 gals.) in the previous year. Output of ammonium products was 2892 tons (18.02 lb. per ton of coal) and of benzol, etc., products 542,490 gals. (1.51 gals. per ton of coal). Income from sales of tar, etc., was £32,163, benzol, etc., £14,831. The report adds: "The average income received from tar was 28s. 1d. per ton compared with 32s. 2d. for the previous year. There is, however, clear indication of recovery in the market in this residual. The income from benzol and solvent naphtha shows an increase compared with last year."

Foreign News

SWEDEN IS TO SUPPLY machinery and plant to the U.S.S.R. in return for mineral oil and other raw materials, according to a Stockholm report.

THE FIRST NUMBER of a new quarterly periodical, entitled *Nutritional Observatory*, has just appeared, published under the auspices of the Mellon Institute of Industrial Research, University of Pittsburgh, Pa., U.S.A. It is edited by the staff of the Heinz Nutritional Research Division of the Institute, and its object is summarised in its title. The Mellon Institute have likewise issued an illustrated report of their Refractories Investigations. Free copies of both publications will be sent on request to interested specialists in the subjects covered.

WHITE ARSENIC PRODUCTION in the United States in 1939 was the highest on record, according to the Bureau of Mines, U.S. Department of the Interior, totalling 22,341 short tons. The output was 34 per cent. more than that in 1938 and 11 per cent. more than that in 1924, the previous peak year. The sale and use of domestic arsenic was greater than ever before, increasing 71 per cent. over that in 1938 and 27 per cent. over that in 1937. Net imports comprised only 34 per cent. of the total consumption as the European war stopped the increasing flow of foreign material. Exports of white arsenic and calcium and lead arsenate, chiefly to South and Central America, also advanced. The selling price reported by domestic arsenic producers was the lowest in history, although official quotations at New York for white arsenic remained at 3 cents per lb.

EXPERIMENTS MADE in the slaughterhouses at Giessen, Germany, are said to have resulted in improving the lasting quality and efficacy of ice for packing foodstuffs. The formula for the newly processed ice provides for an addition of 0.2 to 0.3 per cent. of "formalin" (a 40 per cent. aqueous solution of formaldehyde) to each 25 litres of water used in the ice-producing chambers.

THE UNITED STATES CARBON BLACK INDUSTRY reached new peaks of production and consumption in 1939, owing to the demands of the warring nations and to the recovery in rubber production, according to the Bureau of Mines, U.S. Department of the Interior. Production was 525,166,000 lb., 10 per cent. more than in 1938; total sales were 560,533,000 lb., an increase of 36 per cent. over 1938. Exports of carbon black passed the 200-million-lb. mark for the first time. The domestic price rallied slightly to 2.45 cents per lb. compared with 2.41 cents in 1938. Export quotations continued downward, being 4.36 cents per lb. compared with 4.51 cents in 1938.

Chemical and Allied Stocks and Shares

THERE has been a moderate check to the better tendency on the Stock Exchange in the absence of improvement in the volume of business. Nevertheless, although best prices touched were not held this week, in many securities further good improvement has been shown on balance, and very little selling was in evidence. There was no very definite trend in shares of chemical and allied companies, but as compared with a week ago, the majority of movements have been in favour of holders.

Imperial Chemical further rallied to 24s. at one time, but later eased to 23s. 9d., which compares with 23s. 4½d. a week ago, while the preference units showed a further good rise from 27s. 6d. to 29s. General Refractories 10s. shares were firmer around 6s. as were Borax Consolidated around 21s. 3d. On the other hand, Lever and Unilever went back 1s. 3d. to 20s., and reduced prices ruled for the 7 per cent. and 8 per cent. preference shares. Dunlop Rubber units fluctuated around 24s. 6d., while British Oxygen attracted attention and improved to 50s. Turner and Newall, however, were lowered sharply in price, and Nairn and Greenwich were reduced to 45s. due partly to deduction of the interim dividend. Barry and Staines further improved to 23s. 9d., but, as in many other directions, the price did not appear to be tested by much business. Triplex Glass were a better market, and have rallied to 18s. 3d., while elsewhere United Molasses had a firm appearance around 18s.

B. Laporte, Fison Packard and numerous other shares were inactive, but in the absence of selling, quotations were well maintained. Greeff-Chemicals Holdings 5s. units transferred at 5s. 7½d. at one time, and Forster's Glass 7½ per cent. preference shares at 18s. 9d., while business in Morgan Crucible 5½ per cent. preference shares took place at 20s. Movements in textile securities were small, due partly to a disposition to await Courtaulds' interim dividend announcement. Elsewhere, Key Glassworks transferred at 54s. 4½d. at one time, while among cement shares there was a better tendency in the hope that the falling-off in the building trade is being offset to some extent by the large supplies required for defence works. Associated Cement were around 47s. In the iron and steel group earlier gains were not fully held, although Stewarts and Lloyds had a firm appearance at 33s. 6d., and Tube Investments were higher at 71s. 10½d. Imperial Smelting were inactive and were quoted at 6s. 3d., and British Match remained at 25s. Pinchin Johnson were better at 16s. 6d., but International Paint were lower at 62s. 6d., although the price did not appear to be tested by much business. Few dealings were recorded in Low Temperature Carbonisation, British Industrial Plastics, Blythe Colour and other smaller-priced shares.

Elsewhere, Boots Drug were rather more active around 35s. 9d., but best prices recorded this week were not maintained. Sangers were firm at 17s. and Beechams Pills 2s. 6d. deferred shares remained around 7s. 3d. British Drug Houses continued to be quoted at 22s. 6d. Cerebos were steady at £6½ and Reckitt and Sons' shares transferred around 75s. Metal Box were very firm at 62s. 6d., and Sanitas Trust shares, which remained under the influence of the financial results, continued to be held firmly. Moreover, Distillers ordinary units attracted attention on general recognition of the very strong position shown by the accounts, and on balance the price has further improved from 55s. 9d. to 57s. It is possible that at the forthcoming meeting reference may be made to the industrial alcohol side of the company's business. Oil shares after showing a further rally, reacted on the statements at the "Shell" meeting, and the shares of this company, which were 36s. 3d. on Monday, subsequently reacted to 33s. 9d. which compares with 33s. 1½d. a week ago.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BRADFORD FERTILISER CO., LTD., Cockermouth. (M., 13/7/40.) June 27, £3500 debenture to Barclays Nominees (Lombard Street), Ltd.; general charge. *£3500. December 27, 1939.

CARBO-ICE INDUSTRIES, LTD., London, E.C. (M., 13/7/40.) June 26, debenture to C. M. W. Trust, Ltd., securing all moneys not ex. £5000 which the holders may be called upon to pay under a guarantee; general charge. *Nil. December 21, 1938.

County Court Judgments

D. AND L. MANUFACTURING CO., LTD., R/O, 68a Western Road, Plaistow. (C.C.J., 13/7/40.) Creosote and tar manufacturers. £21 13s. 7d. May 9.

Receivership

A.U. PRODUCTS, LTD., manufacturing chemists, etc., 33-36 King William Street, E.C. (R., 13/7/40.) C. J. Comins, C.A., of 50 Cannon Street, E.C., was appointed receiver and manager on June 21, under powers contained in debenture dated May 16, 1940.

Company News

International Diatomite have declared a dividend of 4 per cent. (against 4 per cent. actual for nine months). Profit for the year is £6791 (£8262).

Midland Bank, Ltd., announce an interim dividend for the half-year ended June 30, at the rate of 8 per cent. actual less income tax, payable on July 15. The same rate of dividend was declared a year ago.

British Glues and Chemicals, Ltd., have declared a net profit for the year to April 30, of £113,197 (£78,810). Meeting, Connaught Rooms, Great Queen Street, W.C.2, July 17, at noon.

Fricker's Metal and Chemical Co., Ltd., have declared a dividend of 8 per cent. on the 8 per cent. cumulative preference shares. This dividend is a payment on account of the arrears outstanding at December 31, 1939, and will be paid on July 30, less tax at 7s. 6d.

Yorkshire Dyeware and Chemical Co., Ltd., have made a profit for the year to March 31, 1940, of £34,970 (£30,754), and have declared a final dividend of 5 per cent., making 10 per cent. (same) and bonus of 2½ per cent. (nil). Meeting, Great Northern Hotel, Leeds, July 15, at noon.

Palestine Potash, Ltd., report a net profit for 1939 of £80,254 (£25,274) after providing £60,000 for depreciation and £35,000 for tax. An ordinary dividend has not been declared as was the case the previous year. The carry forward is £71,590 (£12,044). The tonnage of potash salts sold during the year increased by 33 per cent., and the amount of bromine by 18 per cent.

New Companies Registered

Crack Pulverising Mills, Ltd. (362,261).—Private company. Capital £5000 in 5000 ordinary shares of £1 each. Pulverisers and crushers of raw or prepared materials, etc. Subscribers: M. Hamburger, Robert H. Kerrison. Secretary: J. S. Hamburger. Solicitors: Coward Chance and Co., 30 Mincing Lane, E.C.3. Registered office: Cunard House, 88 Leadenhall Street, E.C.3.

J. T. Hackett and Co., Ltd. (362,226).—Private company. Capital £1000 in 1000 shares of £1 each. To acquire the business of a manufacturer of chemicals and disinfectants, carried on by J. T. Hackett at 141 Vauxhall Road, Liverpool, as "J. T. Hackett and Co." Directors: John T. Hackett, Joseph Hackett and Timothy E. Hutchings. Registered office: 141 Vauxhall Road, Liverpool.

Bernard J. Ellis, Ltd. (361,447).—Private company. Capital £500 in 500 ordinary shares of £1 each. Manufacturers of, and dealers in, paints, including oil and cellulose paints, varnishes, spirit varnish, enamels, thinners, lacquers, cellulose, lacquer, cellulose pigments, colours, dyes, dyestuffs, chemicals, drugs and industrial, pharmaceutical and other preparations; electricians, mechanical engineers, manufacturers of and dealers in electrical apparatus, etc. First directors: Bernard J. Ellis, 28 Mayfair Gardens, Woodford Green, and Mrs. Lilian Ellis. Secretary: James R. McGuire.